

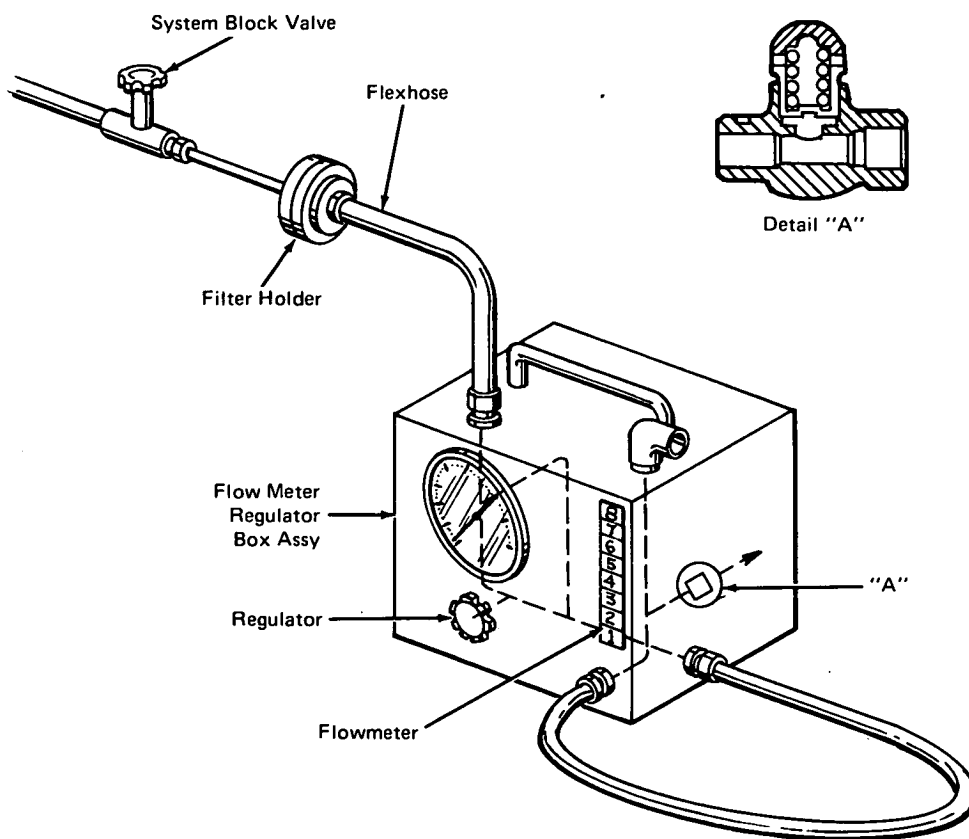
NASA TECH BRIEF

John F. Kennedy Space Center



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Improved Sampling of Compressed Gases for Condensable Hydrocarbon Content



The problem:

The high-purity gases used in the Apollo program require periodic measurements for condensable hydrocarbon contaminants. Previously, these measurements were conducted with a series of absorption chambers filled with carbon tetrachloride. This process was time consuming and required venting of the toxic carbon tetrachloride.

The solution:

An improved sampling process was developed which

uses commercially available high-pressure filters and provides measurements in a fraction of the time required by the previous method.

How it's done:

The equipment for the new sampling method is shown in the figure. Gas is received from the source at specified flow rates. It continues through a high pressure filter holder which is loaded with three 0.45- μ m filters and flow, through the pressure regulator and out through

(continued overleaf)

the flow meter. When a sufficient amount (595 standard liters or 21 standard cubic feet) of gas is sampled, the filters are removed and analyzed.

For comparison, the new technique was tested in parallel with the carbon tetrachloride scrubber method. Nitrogen and helium gases were tested at 20.7×10^4 to 41.4×10^4 N/m² (30-60 psi) pressures at variable flow rates of 4 to 7 standard l/min. High pressure samples (41.4×10^6 N/m²) were tested at full flow rates of 141.6 standard l/min.

Measurements show that there is no significant difference in results between the low-pressure and high-pressure samples. However, in comparison of the two techniques, low-pressure nitrogen samples showed an average oil content of 0.08 ppm with filters and 0.03 ppm with the scrubber method. Similar measurements on helium showed an average oil content of 1.27 ppm for filters and 1.08 ppm for the scrubber.

As evidenced by the results, the filter method is slightly more accurate than the scrubber technique. In

addition, it is faster, safer, and is less subject to contamination.

Note:

Requests for further information may be directed to:
Technology Utilization Officer
Kennedy Space Center
Code AD-PAT
Kennedy Space Center, Florida 32899
Reference: TSP72-10540

Patent status:

NASA has decided not to apply for a patent.

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